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From: Kevin G. Mierzwa

Date: March 16, 2006

Our File No.: 81095826 (FGT 1908 PA)

Your Ref. No. 10/708,675

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Attached is Appeal Brief pursuant to Notice of Appeal dated 2/2/06.

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:

Jianbo Lu — Group Art Unit: 3683

Serial Number: 10/708,675 — Examiner: Sy, Mariano Ong

Filed: 03/18/2004

For: METHOD OF CONTROLLING AN AUTOMOTIVE VEHICLE HAVING A TRAILER USING REAR AXLE SLIP ANGLE

Attorney Docket No: 81095826 (FGT 1908 PA)

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Kevin G. Mierzwa

APPEAL BRIEF

Mail Stop Appeal Brief – Patents
Commissioner for Patents
Box 1450
Alexandria, VA 22313-1450

Sir:

The following Appeal Brief is submitted in response to the Notice of Appeal dated February 2, 2006.

I. Real Party in Interest

The real party in interest in this matter is Ford Global Technologies, LLC, which is a wholly owned subsidiary of Ford Motor Company both in Dearborn, Michigan (hereinafter "Ford").

II. Related Appeals and Interferences

There are no other known appeals or interferences which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

III. Status of the Claims

Claims 1-16 and 21-26 stand rejected in the Final Office Action. Claims 17-20 were deemed allowable if rewritten in independent form.

IV. Status of Amendments

There have been no amendments filed subsequent to the Final Office Action dated November 2, 2005.

V. Summary of Claimed Subject Matter

The claims are best understood when referring to Figure 19. The description of Figure 19 extends from paragraph 125 through paragraph 140.

Claims 1 and 9 are nearly identical except Claim 1 is a method claim and Claim 9 is a system claim. Claim 1 is directed to a method of controlling a vehicle with a trailer while Claim 9 is a control system for an automotive vehicle and a trailer. Claim 1 includes determining the presence of a trailer while Claim 9 recites means to determine the presence of the trailer. This is set forth in lines 2-6 of paragraph 125.

The claims also recite determining a vehicle velocity. This is performed in step 254 which monitors vehicle sensors in step 19. Step 254 looks at the vehicle velocity to determine if the vehicle is in high speed or reverse. This is set forth in paragraph 132 of the present application.

Claim 1 also recites determining a steering wheel angle. A steering wheel input is described in box 254 and is set forth in the fourth line of paragraph 126.

Claim 1 also recites determining a rear axle side slip angle of the vehicle. This is set forth in line 3 of paragraph 132.

Claim 1 also recites applying brake-steer to stabilize the vehicle and trailer when the rear axle slip is above a predetermined rear axle slip angle, the vehicle velocity is above a

velocity threshold and the steering wheel angle is about zero. The application of brake-steer is set forth in paragraph 133 and step 262 of Figure 19. The specific condition such as the rear side slip angle threshold is set forth in the third line of paragraph 134, the vehicle velocity is above a threshold as set forth in the fourth line of paragraph 134, and the steering wheel angle about zero is also set forth in the fourth line of paragraph 134.

As mentioned above, the various steps correspond to various means set forth in Figure 19 and therefore the above description applies equally to Claim 9.

The third and last independent claim is Claim 21. Claim 21 includes determining a presence of the trailer, determining a vehicle velocity, and determining a hand wheel angle position signal corresponding to the angle of the hand wheel angle position and determining a rear axle side slip angle. These steps correspond directly to steps set forth in Figures 1 and 9 above and therefore will not be discussed further.

Claim 21 also includes determining a sensor yaw rate from a yaw rate sensor. This is set forth in paragraph 131.

Claim 21 also recites calculating a hand wheel yaw rate based upon the hand wheel signal. This is also set forth in paragraph 131.

The final step of Claim 21 recites applying brake-steer to the vehicle to stabilize the vehicle and trailer when the rear angle slip angle is above a predetermined rear axle slip angle, the vehicle velocity is above a velocity threshold and the sensor yaw rate is diverging from the hand wheel yaw rate. The slip angle and the vehicle velocity were described above with respect to Claim 1. The sensor yaw rate diverging from the hand wheel yaw rate is determined in paragraph 131. The specific application of brake-steer is discussed in step 262 which is in paragraph 133.

Many of the dependent claims are similar. Therefore, they will be discussed together.

Claims 2, 10 and 22 recite determining the presence of a trailer comprises determining the presence of a trailer with a hitch sensor. This is set forth in line 4 of paragraph 127.

Claims 3, 11 and 23 recite determining the sensor by determining the presence of a trailer with a reverse aid sensor. This is set forth in the third line of paragraph 127 as the backup sensors.

Claims 4, 12 and 24 recite determining the presence of a trailer comprises determining the presence of a trailer with an ultrasonic sensor. As mentioned above, this is set forth in line 3 of paragraph 127.

Claims 5, 13 and 25 recite determining the presence of a trailer comprises determining the presence of a trailer with a camera. Cameras are specifically mentioned in the sixth from the last line of paragraph 126.

Claim 8 recites determining the presence of a trailer comprises detecting a locating plate behind the vehicle. A locating plate is shown in Figures 5 and 5A and is described in line 6 of paragraph 88.

Claim 7 recites that the locating plate comprises locating a hole positioned along a trailer tongue. The hole is specifically described in the second line of paragraph 89 as H1. This is shown in Figure 5B.

Claims 8, 15 and 26 recite that the controller is programmed to brake-steer by applying at least one brake at a first wheel. As described above, applying brake-steer is set forth in various locations including paragraph 133 and step 262 of Figure 19.

Claim 14 recites that the controller is programmed to brake-steer by applying a first brake and a second brake to reduce the turning radius of the vehicle. Again, this is described in paragraph 133, step 262.

Claim 16 recites that the controller is programmed to apply brake-steer by applying an increased drive torque to a second wheel relative to the first wheel. Various types of brake-steer are set forth in paragraph 43 including using positive torques. A positive torque is relative to another wheel.

VI. Grounds of Rejection to be Reviewed on Appeal

The following issues are presented in this appeal:

Whether Claims 1, 2, 5, 9, 10, 13, 21, 22, and 25 are unpatentable under 35 U.S.C. §103(a) over *Faye* (US2002/0069006) in view of *Bottiger* (6,449,542) and *Engle* (5,452,982)

Whether Claims 3, 4, 11, 12, 23, and 24 are unpatentable under 35 U.S.C. §103(a) over *Faye* in view of *Bottiger* and *Engle* as applied to Claims 1, 9 and 21 above in further view of *Breed* (6,748,797)

Whether Claims 6 and 7 are unpatentable under 35 U.S.C. §103(a) over *Faye* in view of *Bottiger* and *Engle* as applied to Claim 1 above in further view of *Bell* (4,428,596)

Whether Claims 8, 15 and 26 are unpatentable under 35 U.S.C. §103(a) over *Faye, Bottiger* and *Engel* as applied to Claims 1, 9 and 21 above in further view of *Wessman* (6,612,394)

Whether Claim 16 is unpatentable under 35 U.S.C. §103(a) over *Faye* in view of *Bottiger* and *Engel* as applied to Claim 9 above in further view of *Schmitt* (6,456,924)

VII. Argument

The Rejection of Claims 1, 2, 5, 9, 10, 13, 21, 22, and 25

Claims 1 and 9

Appellants respectfully submit that the Examiner is picking and choosing elements from various pieces of art to form a hindsight reconstruction of the invention. The *Faye* reference, as the Examiner mentions, does not disclose determining the presence of a trailer and also does not determine a rear axle side slip angle of the vehicle. Also, no teaching or suggestion is provided for applying brake-steer to the vehicle when the rear axle slip angle is above a predetermined rear axle slip angle, the velocity is above a velocity threshold, and the steering wheel is about zero. It appears that the *Faye* reference, as recited in paragraph 4, is used during turning of the vehicle. The Examiner then uses the *Bottiger* reference for determining a rear axle side slip of the vehicle. Appellants admit that side slip angle in the area of the rear wheels is determined as set forth in the abstract. However, the *Bottiger* reference has nothing to do with trailering of a vehicle and therefore, is not properly combinable with the *Faye* reference. Also, the *Bottiger* reference does not teach or suggest applying brake-steer when the rear axle slip angle is above a predetermined slip angle, the vehicle velocity is above a vehicle velocity threshold, and the vehicle steering wheel angle is about zero. Therefore, Appellants respectfully submit there is no teaching or suggestion for making the three-way combination proposed by the Examiner. In order to make a combination, there must be some teaching or suggestion either implicitly or explicitly in the art for making such a combination. By picking and choosing from the various references, the Examiner has failed to find a motivation. Therefore, Appellants therefore respectfully request the Board to reverse the Examiner's position with respect to Claim 1.

Claim 9 is similar to Claim 1 and is believed to be allowable for the same reasons set forth above.

Claim 21

Claim 21 is an independent method claim similar to Claim 1, but recites two different methods for determining a yaw rate. A yaw rate sensor is used and a hand wheel signal is used to determine two different yaw rates. Claim 21 also recites the rear axle side slip angle. Claim 21 recites applying brake-steer to the vehicle to stabilize the vehicle and trailer. When the rear axle slip angle is above a predetermined rear axle slip angle, the vehicle velocity is above a vehicle velocity threshold and the yaw rate sensor is diverging from the hand wheel

rate sensor. No teaching or suggestion is found in any of the references for determining the divergence of the sensor yaw rate and hand wheel yaw rate, let alone the other deficiencies mentioned above with respect to Claim 1. Appellants therefore respectfully request the Board to reverse the Examiner's position with respect to Claim 21 as well.

Claims 2, 5, 10, 13, 22, and 25

Claims 2, 5, 10, 13, 22, and 25 stand or fall together with their base independent claims.

The Rejection of Claims 3, 4, 11, 12, 23, and 24

Claims 3, 4, 11, 12, 23, and 24

These claims also stand or fall together with their independent claims.

The Rejection of Claims 6 and 7

Claims 6 and 7

Claims 6 and 7 stand or fall together with Claim 1.

The Rejection of Claims 8, 15 and 26

Claims 8, 15 and 26

Claims 8, 15 and 26 also stand or fall together with their base independent claims.

VIII. Claims Appendix

A copy of each of the claims involved in this appeal, is attached hereto as Claims Appendix A.

IX. Evidence Appendix

None.

X. Related Proceedings Appendix

None.

XI. Conclusion

For the foregoing reasons, Appellants respectfully request that the Board direct the Examiner in charge of this examination to withdraw the rejections.

Please charge any fees required in the filing of this appeal to deposit account 06-1510 or, if there are insufficient funds, to use deposit account 06-1505.

Respectfully submitted,

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Attorney for Appellant(s)

Date: 3/16/06

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CLAIMS APPENDIX

1. A method of controlling a vehicle with a trailer comprising:

determining a presence of the trailer;

determining a vehicle velocity;

determining a steering wheel angle;

determining a rear axle side slip angle of the vehicle; and

applying brake-steer to stabilize the vehicle and trailer when the rear axle slip angle is above a predetermined rear axle slip angle, the vehicle velocity is above a velocity threshold, and the steering wheel angle is about zero.

2. A method as recited in claim 1 wherein determining the presence of a trailer comprises determining the presence of a trailer with a hitch sensor.

3. A method as recited in claim 1 wherein determining the presence of a trailer comprises determining the presence of a trailer with a reverse aid sensor.

4. A method as recited in claim 1 wherein determining the presence of a trailer comprises determining the presence of a trailer with an ultrasonic sensor.

5. A method as recited in claim 1 wherein determining the presence of a trailer comprises determining the presence of a trailer with a camera.

6. A method as recited in claim 1 wherein determining the presence of a trailer comprises detecting a locating plate behind the vehicle.

7. A method as recited in claim 6 wherein the locating plate comprises a locating hole positioned along a trailer tongue.

8. A method as recited in claim 1 wherein applying brake-steer comprises applying at least one brake at a first wheel.

9. A control system for an automotive vehicle and a trailer comprising:

means to determine the presence of the trailer;

a vehicle velocity sensor generating a vehicle velocity signal;

a steering wheel angle sensor generating a steering wheel angle signal; and

a controller coupled to the means, the velocity sensor and the steering angle sensor, said controller determining a rear axle side slip angle of the vehicle, and when the rear axle side slip angle is above a predetermined rear axle slip angle, the vehicle velocity signal is above a velocity threshold and the steering wheel angle is about zero, said controller programmed to apply brake-steer to the vehicle to stabilize the vehicle and trailer.

10. A system as recited in claim 9 wherein said means to determine the presence of a trailer comprises a hitch sensor.

11. A system as recited in claim 9 wherein said means to determine the presence of a trailer comprises a reverse aid sensor.

12. A system as recited in claim 9 wherein said means to determine the presence of a trailer comprises an ultrasonic sensor.

13. A system as recited in claim 9 wherein said means to determine the presence of a trailer comprises a camera.

14. A system as recited in claim 9 wherein said controller is programmed to brake-steer by applying a first brake and a second brake to reduce the turning radius of the vehicle.

15. A system as recited in claim 9 wherein said controller is programmed to brake-steer by applying at least one brake at a first wheel.

16. A system as recited in claim 9 wherein said controller is programmed to brake-steer by applying an increased drive torque to a second wheel relative to a first wheel.

21. A method of controlling a vehicle with a trailer comprising:

determining a presence of the trailer;

determining a vehicle velocity;

determining a hand wheel angle position signal corresponding to an angle of the hand wheel angle position;

determining a sensor yaw rate from a yaw rate sensor;

calculating a hand wheel yaw rate based upon the hand wheel signal;

determining a rear axle side slip angle; and

applying brake-steer to the vehicle to stabilize the vehicle and trailer when the rear axle slip angle is above a predetermined rear axle slip angle, the vehicle velocity is above a velocity threshold, and the sensor yaw rate is diverging from the hand wheel yaw rate.

22. A method as recited in claim 21 wherein determining the presence of a trailer comprises determining the presence of a trailer with a hitch sensor.

23. A method as recited in claim 21 wherein determining the presence of a trailer comprises determining the presence of a trailer with a reverse aid sensor.

24. A method as recited in claim 21 wherein determining the presence of a trailer comprises determining the presence of a trailer with an ultrasonic sensor.

25. A method as recited in claim 21 wherein determining the presence of a trailer comprises determining the presence of a trailer with a camera.

26. A method as recited in claim 21 wherein applying brake-steer comprises applying at least one brake at a first wheel.